PATENT CLAIMS

1) Cooling plate for an iron- and steelmaking furnace comprising: a copper cooling plate body (12) with at least one cooling duct (14), which extends essentially parallel with the back of the cooling plate body (12), and

at least one connection piece (20, 22), which is arranged on the back of the cooling plate body (12) and terminates in the at least one cooling duct (14) in the cooling plate body (12),

characterised by

a ~~insert~~ formed piece (24,124), which is ~~inserted~~ fitted in a prefabricated, externally accessible recess in the cooling plate body (12) and forms a deflection surface for the cooling medium in the area of the opening of the connection piece (20, 22) into the cooling duct.

2) Cooling plate according to claim 1, characterised in that the ~~insert~~ formed piece (124) is arranged in an axial extension of the cooling duct, said deflection surface (134) being formed by its end faces.

3) Cooling plate according to claim 2, characterised in that the cooling duct 14) is formed by a duct which forms an opening (126) into an end face of the cooling plate body (12), the ~~insert~~ formed piece being a plug (124), which is inserted in this opening and extends to the opening of the connection piece (20, 22) into the cooling duct (12), where it forms the deflection surface for the cooling medium.

4) Cooling plate according to claim 2 or 3, characterised in that the deflection surface (134) is formed by a bevelled end of the ~~insert~~ formed piece (124).

5) Cooling plate according to claim 1, characterised in that the ~~insert~~ formed piece is a prefabricated transition piece (24), which has an internal, curved transition duct (34) as a deflection surface, which forms a first and second opening in the transition piece (24), the transition piece (24) being inserted sealed from the outside in a suitably adapted recess in the copper cooling plate body (12), into which the cooling duct (14) forms an opening, the first opening (36) of this transition duct (34) opening into the connection piece (20, 22) and the second opening (38) of the transition duct (34) in the cooling plate body (12) lying opposite the opening of the cooling duct (14) into the recess.

6) Cooling plate according to claim 5, characterised in that the cooling duct (14) in the cooling plate body (12) has a first cross-section and the connection piece (20, 22) a second cross-section, the transition from the first to the second cross-section taking place progressively in the transition duct (34) of the transition piece (24).

7) Cooling plate according to claim 6, characterised in that the cooling duct (14) in the cooling plate body (12) has an oblong cross-section and the connection piece (20, 22) a circular cross-section, the transition from the oblong to the circular cross-section taking place progressively in the transition duct (34) of the transition piece (24).

8) Cooling plate according to claim 5, 6 or 7, characterised in that the transition piece (24) has a shoulder (32), which projects from the back of the cooling plate (10).

9) Cooling plate according to one of claims 5 to 8, characterised in that the connection piece (20, 22) is welded or soldered into the transition piece (24).

10) Cooling plate according to one of claims 5 to 9, characterised in that the recess for the transition piece (24) is cut into the copper cooling plate body (12) from the rear, the depth of the recess being smaller than the thickness of the cooling plate body (12).

11) Cooling plate according to one of claims 5 to 10, characterised in that the recess for the transition piece (24) terminates in the end phase (16, 18) of the cooling plate body (12) and the transition piece (24) closes the cooling duct (14) in this end phase.

12) Cooling plate according to one of claims 1 to 11, characterised in that the at least one cooling duct (14) is a blind hole, which was drilled into the cooling plate body (12).

13) Cooling plate according to one of claims 1 to 12, characterised in that the cooling plate body (12) is a ~~continuously cast~~ continuously cast cooling plate, wherein the at least one cooling duct (14) is formed as a continuous duct during continuous casting.

14) Cooling plate according to one of claims 5 to 13, characterised in that the prefabricated transition piece is a mould casting made from copper or a copper alloy.

15) Cooling plate according to claim 14, characterised in that a gap between the cooling plate body (12) and the transition piece (24) inserted in the recess is welded or soldered therein.

16) Process for the manufacturing of a cooling plate for an iron- and steelmaking furnace comprising the following steps:

manufacturing a cooling plate body (12) from copper or a copper alloy with at least one cooling duct (14) which extends essentially parallel with the back of the cooling plate body (12), said finished cooling plate body (12)

comprising at least one externally accessible recess into which the cooling duct (14) opens;

fitting a formed piece (24, 124) into the recess of the finished cooling plate body (12);

arranging a connection piece (20, 22) at the back of the cooling plate body (12) in such a manner that the connection piece (20, 22) forms an opening into the cooling duct, and that the formed piece (24, 124) inserted into the recess forms a deflection surface (34, 134) for the cooling fluid in the region of this opening.

17) Process according to claim 16, wherein :

the recess is formed in an axial extension of the cooling duct (14), and said deflection surface (134) is formed by an end face of the formed piece (124).

18) Process according to claim 17, wherein the cooling duct (14) is formed by a duct which forms an opening (126) into an end face of the cooling plate body (12), the formed piece being a plug (124) which is inserted into this opening (126) and extends to the opening of the connection piece (20, 22) into the cooling duct (12), where it forms the deflection surface for the cooling medium.

19) Process according to claim 17 or 18, wherein the deflection surface (134) is formed by a bevelled end of the formed piece (124).

20) Process according to claim 16, wherein the formed piece is a prefabricated transition piece (24) which has an internal curved transition duct (34) as a deflection surface, which forms a first and a second opening in the transition piece (24), the transition piece (24) being inserted sealed from the outside in a suitably adapted recess in the copper cooling plate body (12) into which the cooling duct (14) forms an opening, and the first opening (36) of this transition duct (34) opening into the connection piece (20, 22), and the second opening (38) of the transition duct (34) lying in the

cooling plate body (12), opposite the opening of the cooling duct (14) into the recess.

21) Process according to claim 20, wherein the cooling duct (14) in the cooling plate body (12) has a first cross-section and the connection piece (20, 22) has a second cross-section, the transition from the first to the second cross-section taking place progressively in the transition duct (34) of the transition piece (24).

22) Process according to claim 21, wherein the cooling duct (14) in the cooling plate body (12) has an oblong cross-section and the connection piece (20, 22) has a circular cross-section, the transition from the oblong to the circular cross-section taking place progressively in the transition duct (34) of the transition piece (24).

23) Process according to claim 20, 21 or 22, wherein the transition piece (24) has a shoulder (32) which projects from the back of the cooling plate (10).

24) Process according to any one of claims 20 to 23, wherein the connection piece (20, 22) is welded or soldered into the transition piece (24).

25) Process according to any one of claims 20 to 24, wherein the recess for the transition piece (24) is milled into the copper cooling plate body (12) from the rear, the depth of the recess being smaller than the thickness of the cooling plate body (12).

26) Process according to any one of claims 20 to 25, wherein the recess for the transition piece (24) terminates in the end face (16, 18) of the cooling plate body (12) and the transition piece (24) closes the cooling duct (14) in this end face.

27) Process according to any one of claims 20 to 26, wherein the at least one cooling duct (14) is a blind hole, which is drilled into the cooling plate body (12).

28) Process according to any one of claims 20 to 27, wherein the cooling plate body (12) is a continuously cast cooling plate, wherein the at least one cooling duct (14) is formed as a continuous duct during continuous casting.

29) Process according to any one of claims 20 to 28, wherein the prefabricated transition piece is a mould casting made from copper or a copper alloy.

30) Process according to claim 29, wherein a gap subsisting between the cooling plate body (12) and the transition piece (24) inserted into the recess, is closed by welding or soldering.